UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,808	05/10/2001	Alexander C. Vlachos	00100.00.0300	5480

23418 7590 12/17/2003

VEDDER PRICE KAUFMAN & KAMMHOLZ
222 N. LASALLE STREET
CHICAGO, IL 60601

EXAMINER	
JANKUS, ALMIS R	

ART UNIT	PAPER NUMBER
2671	4

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/852,808	VLACHOS ET AL.	
	Examiner	Art Unit	
	Almis R Jankus	2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11-47* is/are allowed.

6)☒ Claim(s) *1* is/are rejected.

7)☒ Claim(s) *2-10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicants' response of 9/30/03 has been considered by the examiner in preparing this Office Action.

2. Claim 2 stands rejected under 35 U.S.C. 102(e) as being anticipated by Kato for the reasons stated in the prior office action.

With respect to claim 1, Kato teaches the claimed method for generating a cubic Bezier triangular control mesh corresponding to a triangular primitive, comprising: receiving vertex parameters corresponding to three vertices of the triangular primitive, wherein the vertex parameters for each vertex includes three-dimensional coordinates and a normal vector; calculating two control points corresponding to each edge of three edges of the triangular primitive based on the vertex parameters of vertices that define the edge; and calculating a central control point using the vertex parameters for each of the three vertices and the control points corresponding to the three edges, at column 7 lines 23-27, at column 7 line 45 to column 8 line 8, and at figure 9. At column 7 lines 23-27, Kato teaches "triangular Bezier patches (bicubic patches) are used to represent the curved surface represented by a polygon to provide a more accurate reconstruction of the surface due to the high flexibility of the Bezier patch" which satisfies the preamble of claim 1; at columns 7-8 Kato teaches "the position information

of the vertices is assigned to the three Bezier parameter fields" which reads on receiving the claimed "three-dimensional coordinates"; "the surface normal information previously stored as a part of the reconstruction data is retrieved" which reads on receiving the claimed "normal vector"; Kato teaches at column 7 starting at line 64 "all of the vectors are computed as 3D vectors. The data for representing the 2 surface tangents for each edge spline 901, 902, 903 are assigned to 2 Bezier parameter fields responsive to equations 906, 907, 909, 910, 912, 913. Next, the distance the Bezier patch will project from the plane containing the endpoints of the patch is computed responsive to equation 914, and assigned to the last Bezier parameter field, giving the last of the 10 Bezier control points", which reads on the claimed "calculating two control points corresponding to each edge", and "calculating a central control point using the vertex parameters for each of the three vertices and the control points corresponding to the three edges". Note, at figure 9 there are two calculated control points for each triangle edge, "b102", "b201" (for one edge); "b012", "b021" (for another edge); and "b210", and "b120" (for the third edge); with the equations listed at figure 9 under "Conversion Equations". Control point "b111" corresponds to the claimed central control point.

3. Claims 2-10 stand objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. Claims 11-47 stand allowed.

5. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claim 2, the prior art of record does not fairly teach "mapping a segment equal to a fraction of a length of the edge to a first plane defined by a first normal corresponding to a first vertex of the vertices that define the edge, wherein the segment is mapped such that the segment is coplanar with the edge and the first normal, wherein a first end of the segment as mapped corresponds to the first vertex and wherein a second end of the segment as mapped defines a first control point corresponding to the edge;

and mapping the segment to a second plane defined by a second normal corresponding to a second vertex of the vertices that define the edge, wherein the segment is mapped such that the segment is coplanar with the edge and the second normal, wherein a first end of the segment as mapped corresponds to the second vertex and wherein a second end of the segment as mapped defines a second control point corresponding to the edge";

With respect to claim 6 the prior art of record does not fairly teach the claimed "projecting a second vertex of the vertices that define the edge into a first plane defined

by a first normal corresponding to a first vertex of the vertices that define the edge to produce a first reference segment corresponding to the edge, wherein projecting the second vertex is performed in a direction parallel to the first normal, wherein a fraction of the first reference segment defines a first control point corresponding to the edge;

and projecting the first vertex into a second plane defined by a second normal corresponding to the second vertex to produce a second reference segment corresponding to the edge, wherein projecting the first vertex is performed in a direction parallel to the second normal, wherein a fraction of the second reference segment defines a second control point corresponding to the edge";

With respect to claim 8 the prior art of record does not fairly teach the claimed "reflecting each of the three vertices through a line defined by a pair of the control points to produce a reflected point, wherein each control point of the pair of control points for reflection of a particular vertex is determined using a plane defined by the normal corresponding to the particular vertex, wherein the reflected point is defined by a set of three-dimensional coordinates;

averaging the three-dimensional coordinates of the reflected points produced by reflecting the three vertices to produce coordinates corresponding to the central control point";

With respect to claim 9 the prior art of record does not fairly teach the claimed "determining each coordinate value for the central control point by:

adding corresponding coordinate values of the control points for each of the edges to produce a first sum;

adding corresponding coordinate values for the three vertices to produce a second sum;

dividing the first sum by four to produce a first value;

dividing the second sum by six to produce a second value;

and subtracting the second value from the first value";

With respect to claim 10 the prior art of record does not fairly teach the claimed "combining at least a portion of the vertex parameters of the three vertices and parameters for the control points corresponding to the edges based on a user-specified combining parameters";

With respect to claim 11 the prior art of record does not fairly teach the claimed "generating a plurality of planar triangle primitives using the cubic Bezier triangular control mesh, wherein the plurality of planar triangle primitives approximate the non-planar surface in three dimensions" as a third step after the known steps of "receiving vertex parameters corresponding to three vertices of a triangular primitive that represents the non-planar surface, wherein the vertex parameters for each vertex include three-dimensional coordinates and a normal vector;

calculating a set of control points corresponding to the triangle primitive based on the three vertices, wherein the set of control points and the vertices define a cubic Bezier triangular control mesh";

With respect to claim 33 the prior art of record does not fairly teach the claimed "a tessellation block operably coupled to the control point generation block, wherein the

tessellation block tessellates the higher-order graphics primitive to produce a plurality of planar triangle primitives;

and a three-dimensional graphics pipeline operably coupled to the tessellation block, wherein the three-dimensional graphics pipeline processes the plurality of planar triangle primitives to produce pixel data".

6. Applicant's arguments filed 9/30/03 have been fully considered but they are not persuasive.

In the remarks, Applicant's argue that Kato teaches calculating distances that a Bezier patch will project from the plane containing the end points of the patch rather than teaching a central control point using the vertex parameters for each of the three vertices and the control points corresponding to the edges. While it is true that distances are taught, Kato explicitly teaches the calculated points as "control points" (see column 7, paragraph beginning at line 23; and partial paragraph at top of column 8).

Claim 1 fails to teach any explicit method of calculating control points, only which elements to use in the calculations. The claimed elements correspond to those found in Kato. As can be seen at Kato, figure 9, the two control points corresponding to each edge are based on the vertex parameters of the vertices that define the edge. For example, the edge 901 is defined by vertices V0 and V1. The two control points (b210 and b120) on that edge (901) are calculated based on the vertex parameters that define

edge 901, i.e., vertices V0 and V1. Looking at the equations at figure 9, it can be seen that control point b210 is calculated using vertex V0 (equation 906); and that control point b120 is calculated using vertex V1 (equation 907). With respect to the central control point (b111), it can be seen that equation 914 includes the parameters for each of the three vertices (V0, V1 and V3), and the control points corresponding to the three edges (t00, t11, t22, t10, t21, and t02). Therefore, applicants' arguments are not persuasive.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Almis R Jankus whose telephone number is 703-305-9795. The examiner can normally be reached on M-F, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman can be reached on 703-305-9798. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-6606 for regular communications and 703-308-6606 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

AJ
December 12, 2003

ALMIS R. JANKUS
PRIMARY EXAMINER